

2009 Drought Water Bank Biological Assessment

1.1 Introduction

Since 2007 and 2008 were critically dry years and reservoir storage levels are expected to be extremely low in 2009, it is likely that some California water providers will need to supplement local and imported supplies with water transfers from willing sellers. To help facilitate the transfer of water throughout the State, the Department of Water Resources (DWR) proposes to initiate a 2009 Drought Water Bank (DWB). To implement the DWB, DWR would purchase water from willing sellers upstream of the Sacramento-San Joaquin Delta (Delta). This water would be transferred using State Water Project (SWP) or Central Valley Project (CVP) facilities to water users that are at risk of experiencing water shortages in 2009 due to drought conditions and that require supplemental water supplies to meet anticipated demands. The Governor of California has requested emergency drought assistance under the Reclamation States Emergency Drought Relief Act of 1991 (Act), Public Law 102-250, as amended. The Commissioner of the Bureau of Reclamation (Reclamation) has determined that emergency drought assistance is merited. The Mid Pacific Region of Reclamation would participate in the DWB pursuant to Section 101 of the Act, to ensure that operations of the two projects can be coordinated effectively to maximize the ability of the DWB to move water from willing sellers to buyers to address critical water needs.

DWR has initiated dry year water purchasing programs in the past, including drought water banks during the early 1990s, and dry year water purchase programs in 2001 through 2004. Water supplies from the DWB would be open to all water providers who can obtain water from the Delta either directly or by exchange with other water providers who have access to Delta water supplies from the SWP or CVP. Contract provisions of the SWP and CVP will be honored in determining access to Delta pumping capability if this capacity becomes constrained. DWR is coordinating closely with Reclamation, Department of Fish and Game (DFG) and U.S. Fish and Wildlife Service (Service) on the proposed DWB.

This biological assessment (BA) analyzes the potential effects of the proposed DWB in accordance with the legal requirements set forth under Section 7 of the Endangered Species Act (ESA) (16 U.S.C. 1536(c)). A species list for the potentially affected area was generated on December 8, 2008 from the Sacramento Fish and Wildlife Office website at http://www.fws.gov/sacramento/es/spp_lists/auto_list_form.cfm. Of these species, the proposed project has the potential to affect *Thamnophis gigas* (giant garter snake) and San Joaquin Kit Fox (*Vulpes macrotis mutica*).

Because the proposed action would involve water transfers conveyed using existing facilities within the existing operational parameters addressed in the Biological Opinions

on the Continued Long-term Operations of the CVP/SWP and any other regulatory restrictions in place at the time of implementation of the water transfers, Endangered Species Act Section 7 consultation and Essential fish Habitat consultation for special status fish species is being done under the consultation for the Continued Long-term Operations of the CVP/SWP, and thus they are not addressed in this BA. Current operational parameters applicable to conveyance of transfer water for the DWB include: a maximum amount of 600,000 acre feet per year is allowed for all types of water transfers; and transfer water will be conveyed during July through September only.

1.2 Potentially Affected Area

The study area includes those areas of California that might receive benefits from DWB actions or areas potentially affected by the DWB because they serve as a site for DWB water acquisition or conveyance. Water conveyance through the Delta is a significant constraint. Water transfers originating upstream from the Delta and going to service areas downstream of the Delta would require moving water through the Delta. Constraints to transferring water through the Delta range from physical limitations to regulatory requirements. Reclamation and DWR will ensure careful coordination of transfers with existing SWP and CVP operations in meeting water rights, water quality, and fishery protection measures when approving potential water transfers moving water through the Delta.

The overall study area includes specific areas of analysis for each resource that may be directly or indirectly affected by potential DWB acquisitions. In a general sense, these areas of analysis comprise (1) watersheds of rivers that may be the source of stored reservoir water or may participate in groundwater substitution or crop idling; (2) rivers used to convey DWB transfer water; (3) lands that may be used for crop idling and adjacent lands; (4) groundwater basins that may be affected by groundwater substitution (5) district, on-farm and SWP or CVP conveyance facilities; and (6) storage and conveyance facilities in areas that would receive water from DWB transfers. The study area includes:

- Upstream dams and reservoirs on the Sacramento, Feather, Yuba, American, and Merced Rivers where water may be acquired including:
 - Lake Shasta (Sacramento River);
 - Hell Hole, French Meadows, and Folsom Reservoirs (American River);
 - Lake McClure (Merced River);
 - Stony Gorge Reservoir (Sacramento)
 - New Bullards Bar Reservoir (Yuba)
 - Camp Far West Reservoir (Yuba)
 - Collins Lake (Yuba)
- Water bodies downstream from the above reservoirs, including:
 - Sacramento River;
 - South Fork Feather River, Middle Fork Feather River (downstream from the South Fork), and the lower Feather River;

- Yuba River;
 - Middle Fork American River, North Fork American River (downstream from the Middle Fork), and the lower American River;
 - Merced and San Joaquin Rivers;
- The Sacramento-San Joaquin Delta;
 - Portions of the CVP and the SWP systems;
 - San Luis Reservoir;
 - Two terminal Department of Water Resources (DWR) reservoirs in which the Metropolitan Water District (WD) controls a portion of the storage: Perris and Castaic;
 - Metropolitan WD facilities
 - Santa Clara Valley WD facility: Anderson Reservoir;
 - Agricultural lands in the Sacramento Valley (Butte, Colusa, Glenn, Placer, Sutter, and Yolo Counties) in which farmers participate in crop idling; and
 - Groundwater basins that participate in making water available for transfer via groundwater substitution

Regulating and other reservoirs downstream from reservoirs where water may be acquired or stored are dismissed in the effects assessment because these reservoirs are normally operated to receive variable flows, and DWR actions would not affect operations of those downstream reservoirs. Increases in reservoir inflow would not affect the regulator reservoir storage levels because increased releases would match the increased inflow.

2. Description of Proposed project

The proposed project would make water available to buyers from willing sellers upstream of the Delta during the 2009 water year only. Up to 389,328 af would be made available for transfer through a combination of crop idling, crop substitution, groundwater substitution, and reservoir re-operation, and would be available for purchase by public and private water providers in California based on certain needs criteria (<http://www.water.ca.gov/drought/>). The existing SWP or CVP facilities would be used to transfer water to providers that require supplemental water supplies to meet anticipated demands and that are at risk of experiencing water shortages in 2009 due to drought conditions. Water transfers to areas downstream of the Delta would be assumed to lose an estimated 20 percent of the water obtained from the Sacramento River and its tributaries to carriage losses in the Delta. In addition, water transfers involving conveyance through the Delta would be implemented within the operational parameters of the Biological Opinions on the Continued Long-term Operations of the CVP/SWP (Opinions) and any other regulatory restrictions in place at the time of implementation of the water transfers. Current operational parameters applicable to conveyance of transfer water for the DWR include: a maximum amount of 600,000 acre feet per year is allowed for all types of water transfers; and transfer water will be

conveyed during July through September only.

Reclamation's proposed action only includes transfers to the DWR's DWB that Reclamation has the authority to approve. Since these transfers represent a subset of the entire DWB, Reclamation considered the overall DWB to be an interrelated action. Reclamation does not consider the DWB to be an interdependent action since the DWB could exist and function without any Reclamation approved transfers. Therefore, Reclamation has included within the effects analysis the effects of all transfer activities to the DWB as it is an interrelated action.

Tables 1 and 2 lists agencies that may be willing to sell water to the DWB along with a maximum amount of potentially available water volumes. DWR would only make purchases from willing sellers. The numbers presented are estimates and reflect the potential upper limit of available water. Actual purchases would depend on hydrology, Bank funding (interested buyers), the amounts that sellers would ultimately be willing to transfer in 2009 and compliance with CVPIA transfer requirements. The potential transfers identified in Tables 1 and 2 may not all occur.

<i>Table 1</i>				
<i>Potential Sellers (Upper Limits)</i>				
<i>(AF)</i>				
<i>Water Agency (County)</i>	<i>Stored Reservoir Water</i>	<i>Groundwater Substitution</i>	<i>Crop Idling/ Substitution</i>	<i>% of Anticipated 2009 CVP Allocation (75%)</i>
Upstream from the Delta Region				
Sacramento River Area of Analysis				
Conaway Preservation Group (Yolo)			24,872	65
Glenn-Colusa Irrigation District (Glenn and Colusa)			50,000	8
Lewis Ranch (Colusa)		2,000		43
Maxwell ID (Colusa)		1,200	2,500	27
Meridian Farms (Sutter)		1,000	2,000	11
Natomas Central MWC (Sutter and Sacramento)		10,000		11
Reclamation (via Orland Unit Water	10,000			

User's Association) (Glenn)				
Parrot Investment Company (Butte)			1,500	11
Pelger MWC (Sutter)		1,500	2,000	53
Pleasant Grove- Verona MWC (Sutter)		6,000	4,000	51
Princeton-Cordora- Glenn ID (Glenn and Colusa)			3,000	6
Provident ID (Glenn and Colusa)			3,000	7
Reclamation District 108 (Colusa and Yolo)		4,000	20,000	14
Reclamation District 1004 (Colusa)		20,000	10,000	56
River Garden Farms (Yolo)		3,500		16
Sacramento River Ranch (Yolo)			1,296	43
Sutter MWC (Sutter)			10,000	6
Sycamore MWC (Butte)		2,400	6,360	37
American River Area of Analysis				
City of Sacramento (Sacramento)		5,000		7
Totals	10,000	56,600	140,528	

Table 2 Potential Non-CVP Sellers (Upper Limits) (AF)			
Water Agency	Stored Reservoir Water	Groundwater Substitution	Crop Idling/ Substitution
Sacramento River Area of Analysis			
Amaral Ranch		2,000	2,000

(Sutter)			
Carter MWC (Colusa)		650	
Lewis Ranch (Colusa)		2,000	
Pinnacle Land Ventures, LLC (Broomieside Farms) (Sutter)		10,000	
Upper Swanston Ranch (Yolo)		8,500	
Feather River Area of Analysis			
Brown's Valley ID (Yuba)	5,000		
Butte WD (Butte and Sutter)		10,000	10,000
Garden Highway MWC (Sutter)		2,000	
Goose Club Farms (Sutter)			3,500
Richvale ID (Butte)			10,000
South Sutter WD (Sutter and Placer)	10,000		
Plumas Mutual Water Company (Yuba)		2,800	1,750
Sutter Extension WD (Sutter)		11,000	14,000
Western Canal Water District (Butte and Glenn)			20,000
American River Area of Analysis			
Placer County WA (Placer)	20,000		
Sacramento Suburban WD		12,000	
Merced/San Joaquin River Area of Analysis			
Merced Irrigation District (Merced)	25,000		

Abbreviations:

GW: Groundwater

ID: Irrigation District

MWC: Mutual Water Company

WA: Water Agency

WD: Water District

Table 3 identifies potential buyers who have indicated interest in participating in the DWB. Not all of these potential buyers may end up actually purchasing water from the DWB. These potential buyers are predicting significantly reduced 2009 water supply allocations. It is anticipated that water made available to them from the DWB would be prioritized as follows: existing health and safety domestic needs, municipal supply subject to water shortage contingency plan measures, and agricultural irrigation for existing crops and livestock subject to water shortage contingency plan measures. Buyers' participation in the DWB will be subject to the terms identified in the Draft Water Transfer White Papers (<http://www.water.ca.gov/drought/>), including meeting a critical needs assessment and having a plan with the goal of 20% reduction in water demand based on conservation efforts.

DWR would administer the distribution of water from the DWB based on the DWB critical needs criteria (<http://www.water.ca.gov/drought/>). The Governor of the State of California has declared a state of emergency regarding drought conditions, and has ordered that the State Water Resources Control Board shall expedite the processing and consideration of the request by DWR for approval of the consolidation of the places of use and points of diversion for the SWP and CVP to allow flexibility among the projects and to facilitate water transfers and exchanges. It is anticipated that the State Water Resources Control Board (SWRCB) will approve a consolidated place of use for the CVP and SWP in order to facilitate these transfers.

Table 3	
Potential Buyers (Upper Limits)	
(AF)	
Water Agency	Amount Requested
Downstream from the Delta Region	
CVP	
San Luis & Delta Mendota Water Authority	180,000
Byron Bethany Irrigation District	
Del Puerto Water District	
Eagle Field Water District	
James Irrigation District	
Laguna Water District	
Mercy Springs Water District	
Oro Loma Water District	
Pacheco Water District	
Panoche Water District	
Patterson Irrigation District	
RD 1606	
San Benito County Water District	
Santa Clara Valley Water District	30,000
Tranquility Irrigation District	
West Side Irrigation District	

West Stanislaus Irrigation District	
Westlands Water District	
City of Avenal	
City of Coalinga	
City of Huron	
Avenal State Prison	
Broadview Water District	
Banta Carbona Irrigation District	
SWP	
Alameda County WD	20,000
Antelope Valley East Kern Water Agency	28,212
Castaic Lake Water Authority	10,000
Central Coast Water Authority	15,000
Contra Costa Water District	20,000
Desert Water Agency	10,000
Dudley Ridge Water District	7,500
East Bay Municipal Utility District	10,000
Kern County Water Agency	123,333
Metropolitan Water District of Southern California	300,000
Mojave Water Agency	1,000
Oak Flat Water District	1,000
Palmdale Water District	8,000
San Bernardino Valley Municipal Water District	20,000
San Diego County Water Authoirity	10,000
Tulare Lake Basin Water Storage District	20,000
Walnut Valley Water District	10,000
Upstream from the Delta Region	
CVP	
Bella Vista Water District	2,000
Dunnigan Water District	2,000
Tehama Colusa Canal Authority	25,000
SWP	
City of Yuba City	2,000
Napa County Flood Control and Water Conservation District	13,860

Potential Water Transfer Methods

Crop Idling/Substitution

Crop idling would make water available for transfer that would have otherwise been used for agricultural production. The proceeds from the water transfer would pay farmers to idle land that they would otherwise have placed in production. Rice is the most likely crop that would be idled.

Crop idling water would be available at the beginning of the season as soon as the crop is not planted. Typically, water acquisitions from crop idling would be retained in upstream reservoirs until they could be transferred through the Delta and pumped south. However, releases from Lake Shasta would likely need to be maintained during April and May to meet downstream temperature and flow requirements. Therefore, water acquired from sellers on the Sacramento River most likely could not be backed up into Lake Shasta and could not be conveyed south until the Delta pumps are available in July through September.

Crop substitution is another potential method to make water available for the DWB. Crop substitution acquisitions would pay farmers to substitute a crop with one that uses less water, and the surplus water would be available for transfer. Since crop substitution has similar effects to crop idling, it is included in the crop idling discussion for the remainder of this document.

To minimize socioeconomic effects on local areas and to minimize effects on special status species, the project agencies will not approve water transfers via crop idling if more than 20 percent of recent harvested rice acreage in the county would be idled. Transfers made available by crop idling/substitution by CVP contractors may yield up to 140,528 af.

A central objective of any water transfer program based on crop idling or substitution is to reduce the consumptive use or surface water applied for irrigation. Reclamation and DWR will ensure that each approved transfer proposal makes a credible case that reduction in surface water diversions would occur consistent with Reclamation's Interim Guidelines for Implementation of Water Transfers Under XXXIV of Public Law 102-575. Diversion data for the project year will be evaluated by Reclamation and DWR.

Groundwater Substitution

Groundwater substitution is another proposed method to make water available for the DWB. Groundwater substitution transfers occur when sellers forego their surface water supplies and pump an equivalent amount of groundwater as an alternative supply. Because the potential groundwater substitution transfers are primarily from agricultural users, the water from this acquisition method would be available during the irrigation season of April through October. Typically, surface water made available through groundwater substitution is stored upstream until the Delta pumps have the capacity available to convey water south. However, as previously discussed, on the Sacramento River, water often cannot be held in Lake Shasta because of downstream temperature and flow requirements. All transfer water under the proposed action that would require conveyance through the Delta would be moved through the Delta from July through September. Transfers made available by groundwater substitution may yield up to 117,550 af. The groundwater substitution option is explained in detail in the Draft Water Transfer White Papers (<http://www.water.ca.gov/drought/>).

Reservoir Reoperation

Reservoir re-operation is another avenue for water to be made available to the DWB. To ensure that purchasing this water would not affect downstream users, DWR and Reclamation would limit acquisitions to water that would not have otherwise been released downstream. Stored reservoir water sellers will be required to demonstrate that stored water released for transfer would be in addition to the quantity of water normally released under historical and projected reservoir operations. Under the proposed action, DWR may purchase up to 70,000 af of CVP stored reservoir water.

No other types of water transfers would be allowed under the DWB. California laws contain numerous protections that apply to water transfers. However, there are three fundamental principles that apply: no injury to other legal users of water, no unreasonable effects to fish, wildlife or other instream beneficial uses of water, and no unreasonable effects on the overall economy or the environment in the counties from which the water is transferred. California Water Code Section 1745 et seq. protects the underlying water rights from forfeiture for water transfers. Additional information about water rights protection and water transfers is located at www.waterrights.ca.gov in a State Water Resources Control Board (SWRCB) staff document titled “A Guide to Water Transfers”. The project agencies will not support or participate in any water transfer where the aforementioned fundamental principles of water transfers have not been adequately addressed. DWR’s water purchase agreements expressly recognize the legal protections afforded the seller’s underlying water rights in a water transfer.

No other types of water transfers would be allowed under the Drought Water Bank. Potential selling parties are encouraged to work with local water agencies and districts to develop coordinated water transfer proposals capable of providing substantial quantities of water.

Environmental Commitments

- As described in the Draft EA, transfers involving conveyance through the Delta will be implemented within the operational parameters of the Biological Opinions on Continued Long-term Operations of the CVP/SWP.
- As described in the Draft EA, stored reservoir water sellers will be required to demonstrate that stored water released for transfer would be in addition to the quantity of water normally released under historical and projected reservoir operations. In their transfer proposals, sellers will be required to provide monthly reservoir operations for the previous 10 years showing monthly releases and storage levels and the method of measuring stored water releases and accounting for transfer water and reservoir refill (ie reservoir refill criteria) to track reservoir operations during and after the transfer of water.
- As described in the Draft EA, sellers will be required to maintain return flows under the proposed action to minimize potential water supply effects to neighboring and downstream water users.

- As described in the Draft EA, water transfers under the proposed action will be implemented in accordance with meeting flow and temperature requirements on the Sacramento River.
- As described in the Draft EA, the SWRCB will review potential reservoir release for transfers via reservoir reoperation to ensure that potential effects to supply or to other legal users will be minimized.
- As described in the Draft EA, well reviews and monitoring and mitigation plans will be implemented under the proposed action to minimize potential effects of groundwater substitution. Well reviews, monitoring and mitigation plans will be coordinated and implemented in conjunction with local ordinances, basin management objectives, and all other applicable regulations.
- As described in Draft EA, DWR and Reclamation have incorporated the following measures into the proposed action to continue with standard Project operating procedures and to improve the water quality to users south and downstream of the Delta.
 - Carriage water will be used to protect and maintain chloride concentrations in the Delta.
 - DWR will only purchase water if it meets all of the required provisions of DWR's acceptance criteria governing conveyance of non-Project water through the California Aqueduct.
- The 2009 DWB will adopt the crop idling conservation measures from the Environmental Water Account (EWA) Biological Opinion (2004) with some modifications, described below. The following actions to protect the giant garter snake (GGS) will be incorporated into contracts between DWR and the water seller. As part of the contract, DWR will have access to the land to verify how the water transfer is being made available and to verify that the actions to protect the GGS are being implemented:
 - The block size of idled rice parcels will be limited to 320 acres in size with no more than 20 percent of rice fields idled cumulatively (from all sources of fallowing) in each county or area within 1 mile of the following refuge areas: Sacramento National Wildlife Refuge Complex (Sacramento, Delevan, Colusa, Sutter, Butte Sink and Llano Seco Unit), Gray Lodge Wildlife Area (WA), Upper Butte Basin WA, and Gilsizer Slough Conservation Easement. The 320-acre blocks will not be located on opposite sides of a canal or other waterway, and will not be immediately adjacent to another fallowed parcel (a checkerboard pattern is the preferred layout);

- Parcels participating in crop idling for the 2009 DWB will not include:
 - Lands between Refuges that serve as corridors: lands adjacent to Hunters and Logan Creeks between Sacramento National Wildlife Refuge (NWR) and Delevan NWR; the Colusa Basin drainage canal between Delevan and Colusa NWRs; Little Butte Creek between Llano Seco (NWR unit) and Upper Butte Basin WA; and Butte Creek between Upper Butte Basin and Gray Lodge WA;
 - Lands adjacent to Butte Creek, Colusa Drainage Canal, Gilsizer Slough, the land side of the Toe Drain along the Sutter Bypass, Willow Slough and Willow Slough Bypass in Yolo County, and
 - Lands in the Natomas Basin;
- The water seller will maintain a depth of at least two feet of water in the major irrigation and drainage canals (but never more than existing conditions) to provide movement corridors;
- Water will not be purchased from a field fallowed in the previous year;
- As described in Section 9 of this BA, as part of a Giant Garter Snake Baseline Monitoring and Research Strategy for the development of a GGS Conservation Strategy, in addition to the measures described above, DWR and Reclamation are proposing research goals to help quantify and evaluate the response of the GGS to riceland idling. The focus of the Strategy will be in the Colusa, Butte, Sutter, and Yolo Basins. The BA includes further details on these proposed conservation measures.



General Project Area Map

3. General Habitat in the Project Area

Environmental Setting

In general, SWP and CVP water transfers take place upstream of the Delta in the Sacramento Valley. The Sacramento Valley, primarily north and west of the city of Sacramento, is dominated by agricultural land, primarily rice. The average rice production in the Sacramento Valley from 1995 through 2006 was 489,258 acres (Table 1). In addition, the Sacramento Valley has more than 50,000 acres of managed wetlands designed primarily to benefit wintering waterfowl (Fleskes et al., 2005). Giant garter snakes are presumed to be present in seven of the twelve Sacramento Valley counties (USFWS 1999).

4. Environmental Baseline

Over the last 25 years, the acreage of planted rice in the Sacramento Valley has varied from a low of approximately 330,000 acres in 1983 to a high of over 508,000 acres in 1999. Planted acreage varies as a result of a number of factors, including economic and environmental changes, and regular crop rotations. Crop rotation and fallowing are a standard rice farming practice that can reduce disease and increase water quality. In the Sacramento Valley, up to 30% of rice is grown in rotation with other crops and up to 70% is in a rice/fallow rotation (Hill et. al. 1998).

Between 1997 and 2005, rice production in the Sacramento Valley has varied from 369,600 to 508,900 acres with an annual decline of 18,900 acres in 1995 and 72,000 acres in 2001 (Table 1). During this time period, the annual decline of rice planted by county was as high as a 53% in Sacramento County in 2006 and more than 35% of the declines were changes greater than 10% (Table 1).

Table 1. Estimated Sacramento Valley Rice Production (acres) from 1992-2006 by County¹.

Year	Butte	Colusa	Glenn	Sacramento	Sutter	Yolo	Yuba	Total	Annual Change
1992	76,300	94,800	65,800	8,900	73,100	19,000	31,700	369,600	
1993	79,300	112,000	74,500	10,400	81,000	21,400	31,300	409,900	40,300
1994	88,000	123,000	81,000	11,500	90,000	26,700	34,000	454,200	44,300
1995	83,000	122,000	79,000	10,300	82,000	27,000	32,000	435,300	-18,900
1996	97,000	136,000	87,000	8,800	86,000	21,600	34,000	470,400	35,100
1997	97,000	137,000	89,000	9,400	90,000	24,000	35,000	481,400	11,000
1998	88,000	121,000	83,000	9,100	91,000	20,400	37,300	449,800	-31,600
1999	102,500	135,000	88,000	9,700	104,500	30,000	39,200	508,900	59,100
2000	98,000	145,000	87,500	9,000	108,000	35,500	39,000	522,000	13,100
2001	86,800	126,300	78,300	7,800	87,700	26,000	37,100	450,000	-72,000
2002	100,000	138,500	87,500	8,200	101,700	31,500	36,000	503,400	53,400
2003	87,800	138,000	82,500	8,100	96,900	32,300	35,400	481,000	-22,400

2004	105,800	156,400	90,300	9,600	124,000	41,900	34,300	562,300	81,300
2005	96,800	145,600	87,100	7,900	101,800	29,200	33,300	501,700	-60,600
2006	99,100	145,900	87,500	3,700	106,600	28,900	33,200	504,900	3,200
Average	95,150	137,225	85,558	8,467	98,350	29,025	35,483	489,258	

¹California Field Crop Statistics, 1993-2007, California Agricultural Service.

5. Potentially Affected Species

Giant Garter Snake

GGs (*Thamnophis gigas*), is listed as a threatened species under the ESA (58 FR 54033, October 20, 1993). GGS preys primarily on aquatic species such as fish and amphibians. Generally active from April through September, the giant garter snake breeds from March into May, and again briefly in September. Young are brooded internally by females, who give birth to live young from late July into September. Young disperse into dense cover and reabsorb their yolk sacs, then begin feeding on their own. They reach sexual maturity in three to five years.

The GGS is endemic to wetlands of California's Central Valley. The giant garter snake inhabits marshes, sloughs, ponds, small lakes, low gradient streams, other waterways and agricultural wetlands such as irrigation and drainage canals and rice fields, and the adjacent uplands. Essential habitat components consist of (1) adequate water during the snake's active period (i.e., early spring through mid-fall) to provide a prey base and cover; (2) emergent, herbaceous wetland vegetation, such as cattails and bulrushes, for escape cover and foraging habitat; (3) upland habitat for basking, cover, and retreat sites; and (4) higher elevation uplands for cover and refuge from flood waters. A basic GGS habitat unit will incorporate 2.00 acres (0.81 hectares) of surrounding upland for every 1.00 acre (0.40 hectare) of aquatic habitat. The 2.00 acres (0.81 hectares) of upland also may be defined as 218 linear feet (66 meters) of bankside habitat which incorporates adjacent uplands to a width of 200 feet (61 meters) from the edge of the bank.

Another key requirement of the GGS includes maintenance of connectivity between habitats. GGS rely on canals and ditches as movement corridors. These corridors provide important habitat, and are used during daily movement within a home range. GGS are mobile and adapt to changes in their environment. GGS have been reported traveling over one to two miles in a day. Wylie et al. (1997) documented that a GGS will move five miles into surrounding rice fields from marsh and canal habitats that were dewatered during summer. GGS are able to exploit previously unoccupied or newly created habitats readily (USFWS 1999). Radio telemetry studies have established that home ranges for GGS in the Colusa National Wildlife Refuge range from 1 to 9,251 acres with seasonal ranges of up to 150 acres. Most GGS activity within these home ranges is concentrated along canals, sloughs, and the edge of aquatic habitats. (USFWS 2006) GGS inhabit canals primarily between April to November.

The width of uplands used by GGS varies considerably. Many summer basking and refuge areas used by GGS are immediately adjacent to canals and other aquatic habitats

and may even be located in the upper canal banks. USFWS has considered 200 feet as the width of upland vegetation providing habitat along the borders of aquatic habitat for GGS (USFWS 2006). GGS also seek refuge in upland burrows during hot summer weather and have been documented up to 164 feet from aquatic habitat during this time. In a dynamic habitat, GGS frequently move in response to changing conditions in their rice, marsh, canal and ditch habitats, especially during the dry summer months. Connectivity between GGS home range size has been estimated from multiple studies conducted at Colusa NWR, and movement patterns have been described from studies within the Natomas and Colusa Basins. Home range size at Colusa NWR was reported to be as large as 2,792 acres in 1997 (Wylie et al. 1997) and 427 acres in 2001 (Wylie et al. 2002). The Draft Recovery Plan for Giant Garter Snake reports home range sizes as large as 642 acres at Gilsizer Slough and 202 acres at Badger Creek (USFWS 1999). Home range size is likely inversely correlated with habitat quality; such that smaller home range sizes occur in areas with the highest quality habitat. Recent work by Wylie and Hansen suggest that as long as conditions are optimal, snakes will stay close to where they over-winter and larger home range sizes are typically in response to adverse conditions.

GGS can move relatively long distances. Wylie et al. 1997 documented snakes moving up to 4.8 miles over a few days in response to de-watering at Colusa NWR. In the Natomas Basin, snakes routinely moved over a half mile and distances of over a mile were recorded on more than one occasion (Wylie and Casazza 2000). A Colusa Basin study recorded the longest average movement distances of 0.62 miles, with the longest being 1.7 miles, for sixteen snakes in 2006, and an average of 0.32 miles, with the longest being 0.6 miles, for eight snakes in 2007 (Wylie and Amarello 2008).

Historical and Current Distribution

Historically, the giant garter snake was distributed in wetlands throughout the Central Valley. Fitch (1940) described the historical range of the snake from the vicinity of Sacramento and Contra Costa Counties southward to the Buena Vista Lake in the southern San Joaquin Valley. Prior to 1970, the species was recorded from 17 localities (Hansen and Brode 1980). Five of these localities were in Merced County near Los Banos. The conversion of wetlands to other uses, primarily agriculture, likely extirpated the species from Buena Vista Lake and the Tulare Lake Basin by the 1940's-50's (Hansen and Brode 1980, Hansen 1980).

Over the last few decades surveys of the species have revised the current range from near Burrell in Fresno County (Hansen and Brode 1980) north to near Chico in Butte County (Rossman and Stewart 1987). Studies conducted by DFG and the U.S. Geological Survey (USGS) have documented giant garter snakes in portions of the rice producing regions of Sacramento, Butte, Colusa, and Glenn Counties along the western border of the Yolo Bypass in Yolo and Solano counties west to the vicinity of Woodland and Davis in Yolo County and Liberty Farms in Solano County; and along the eastern fringes of the Sacramento-San Joaquin Delta near the Elk Grove region of central Sacramento County southward to the Stockton area of San Joaquin County. In 1998, a giant garter snake was found in the western Sacramento-San Joaquin Delta in the vicinity of Sherman and

Decker Islands. The last record of a snake this far west in the Delta was in the 1940's (USFWS 1999).

Prior to 1980, several areas within the San Joaquin Valley supported populations of giant garter snakes. Surveys of these historical areas in 1986 did not produce any snakes (G. Hansen, 1988). However, surveys of these areas in the 1990's found giant garter snakes at Caldoni Marsh/ White Slough Wildlife Area in San Joaquin County (G. Hansen 1996), Mendota Wildlife Area in Fresno County (G. Hansen 1996), and within the Grasslands Ecological Area in Merced County (USFWS 1999). The San Joaquin Valley populations have apparently suffered severe declines over the last two decades (USFWS 1999, E. Hansen Pers. Comm.).

Currently, the USFWS recognizes 13 separate populations located in (1) the Butte Basin, (2) Colusa Basin, (2) Sutter Basin, (4) American Basin, (5) Yolo Basin/Willow slough, (6) Yolo Basin/Liberty farms, (7) Sacramento Basin, (8) Badger and Willow Creek, (9) Caldoni Marsh, (10) East Stockton Diverting Canal and Duck Creek, (11) North and South Grasslands in the Grasslands Ecological Area, (12) Mendota State Wildlife Area, and (13) Burrell/Lanare (Fresno County). All 13 populations are isolated from each other without protected dispersal corridors. The 11 counties where the giant garter snake is still presumed to occur are: Butte, Colusa, Glenn, Fresno, Merced, Sacramento, San Joaquin, Solano, Stanislaus, Sutter, and Yolo.

Historically, the GGS ranged from Kern County north along the Central Valley to Butte County, with a gap in the central part of the valley. Habitat would have been roughly the area now in rice in the Sacramento Valley, essentially reaching northward to about Stony Creek on the west and Big Chico Creek on the east. Currently, it ranges from Glenn County to the southern edge of the San Francisco Bay Delta, and from Merced County to northern Fresno County. The known range of the GGS has changed little since the time of listing. In 2005, three GGS were observed at the City of Chico's wastewater treatment facility, approximately ten miles north of what was previously believed to be the northernmost extent of the species range.

Very little data exists on the distribution and occurrence of the giant garter snake in ricelands. In 1996 Wylie et al. surveyed rice fields in the Butte Basin near Butte Sink, but failed to find GGS. Three occurrences have been recently discovered in the vicinity of the City of Chico in Butte County. The northernmost sighting extends the extant range of the species to the north by approximately 9.5 miles. GGS have been found in the Colusa Basin, south of the proposed project area. The United States Geological Survey (USGS) has conducted trapping surveys of GGS at the Sacramento National Wildlife Refuge Complex. GGS were observed at each of the federal wildlife refuges (Colusa, Delevan, and Sacramento). It is likely that GGS occur outside of Refuge lands in the adjacent rice production areas.

Reasons for Decline and Threats to Survival

The primary threats to GGS continue to be habitat loss and degradation. For

example, the American Farmland Trust projects a loss of more than one million acres of Central Valley farmland to urbanization by the year 2040 if current changes in land use continue. This farmland includes land that is cultivated in rice. The relatively abundant populations of GGS in the Sacramento Valley may reflect the expansion of available habitat that is provided from rice cultivation. Dependence of the Sacramento Valley populations on agricultural croplands leaves the GGS vulnerable to wide-scale habitat loss in the event of changes in agricultural management such as a change in crops or fallowing large areas of rice fields or encroaching urbanization, which may inhibit rice cultivation.

Destruction of habitat has virtually extirpated the GGS in the San Joaquin Valley whereas the introduction of new predators such as the bull frog, largemouth bass, and catfish have been major factors in the Sacramento Valley, along with changes in water quality, urbanization, and adverse land management practices. Pesticide and fertilizer runoff from agriculture, for example, have been cited as mortality sources for some of this snake's prey. Grazing of vegetation along water sources also threatens this snake (FWS, 1999)

Summary of Consultation to Date

The giant garter snake was listed as a state threatened species in 1971 and a federally threatened species in 1993. The CALFED Programmatic EIS/EIR Record of Decision (August 2000) identified the EWA as one element of its overall strategy for meeting the goals of the CALFED Program. The EWA was a cooperative tool within the CALFED Water Management Strategy, and was established to provide water for the protection and recovery of at-risk fish species beyond water available through existing regulatory actions related to the operations of the State Water Project (SWP) and the Central Valley Project (CVP). Additionally, the program was to:

1. Assist in protecting and restoring at-risk native fish species, and
2. Increase water supply reliability for CVP/SWP water service contractors by reducing uncertainty associated with fish protective actions.

In 2004, the EWA Biological Opinion identified conservation measures for the giant GGS for crop idling and crop substitution water transfers in ricelands. These conservations measures include:

1. Water transfer actions will be limited so that no more than 20% of rice fields are participate in crop idling or substitution transfers in a County,
2. Parcels will not include:
 - a. Lands within one mile of the Sacramento National Wildlife Refuge Complex (Sacramento, Delevan, Colusa, Sutter, Butte Sink and Llano Seco Unit), Gray Lodge Wildlife Area, Upper Butte Basin Wildlife Area, Yolo Bypass Wildlife Area, and Gilsizer Slough conservation easement,

- b. Lands between Refuges that serve as corridors: lands adjacent to Hunters and Logan Creeks between Sacramento and Delevan National Wildlife Refuges; the Colusa Basin drainage canal between Delevan and Colusa National Wildlife Refuges; Little Butte Creek between Llano Seco and Upper Butte Basin Wildlife Area; and Butte Creek between Upper Butte Basin and Gray Lodge Wildlife Areas,
 - c. Lands adjacent to Butte Creek, the Colusa Drainage Canal, Gilsizer Slough, the land side of the Toe Drain along the Sutter Bypass, Willow Slough and Willow Slough Bypass in Yolo County, the North Drainage Canal and East Drainage Canal in the Natomas Basin,
 - d. East of HWY 99 between the Sutter-Sacramento County line and Elverta Road in the Natomas Basin, and
 - e. In Yolo County east of HWY 113.
- 3. The water seller will ensure a depth of at least two feet of water is maintained in the major irrigation and drainage canals (but never more than existing conditions),
- 4. The water agency will ensure that block size of idled parcels will be limited to 160 acres,
- 5. Mowing along irrigation canals will be minimized and mowers will be elevated to at least six inches above ground level,
- 6. If canal maintenance is required, it shall be restricted to one side of the canal in any one year,
- 7. Geographic dispersal of lands will be maximized,
- 8. Purchasing water from the same field for more than two consecutive years or from a field fallowed by another program in a consecutive year will not occur,
- 9. The EWA agencies will recommend that sellers replace culverts already planned for repair or replacement with oversized ones to facilitate better wildlife dispersal, and
- 10. The EWA agencies will recommend that sellers replace water control structures with those requiring less maintenance and less frequent replacement.

In addition, the Biological Opinion also stated that through the Ecosystem Restoration Program (ERP) Implementing Agencies (i.e. USFWS, DFG, and National Marine Fisheries Service (NMFS)) a Conservation Strategy for the giant garter snake was to be developed and include:

1. Specific research objectives,
2. Population surveys, and
3. Experimental analyses of population response to different cropping patterns.

The implementation of the Conservation Strategy was to include:

1. Selecting sites for monitoring,
2. Selecting sites for experimental treatments and adaptive management,
3. Giant garter snake distributional surveys, and
4. Continuing surveys and monitoring responses to changing habitat conditions.

As of 2008, the Conservation Strategy had not yet been developed. In September 2008, DWR and Reclamation were advised by the USFWS to prepare the giant garter snake Conservation Strategy for the Sacramento Valley - the area affected by the DWB and the area likely to be affected by future water transfer programs.

Although the CALFED Environmental Restoration Program (ERP) Implementing Agencies fell short of developing a conservation strategy for the giant garter snake under the EWA, significant contributions were made toward giant garter snake habitat conservation (DFG 2007). ERP has funded several projects that will supplement current knowledge of giant garter snake populations and habitat use.

Two projects were funded that contained actions that benefit giant garter snake through ongoing monitoring of semi-permanent wetlands, rice-cover crop rotation fields, and waterways adjacent to agriculture lands, totaling \$1.1 million in subtasks. Another project funded for \$1.19 million will evaluate the effects of fallowing agricultural habitat on giant garter snake by monitoring habitat use under normal rice growing conditions and comparing results with analogous data from those same fields and adjacent irrigation ditches after fallowing. This project will also monitor habitat use on wetland restoration sites and assess population demographics and viability of the giant garter snake. Study areas for all three projects include Barker Slough and Hastings Cut in Yolo County, Gilsizer Slough in Sutter County, areas within Richvale Water District in Butte County, and various other rice fields and managed wetlands in Butte County. These coordinated ERP projects began work in 2007 and are in the initial stages of data collection. They are designed to provide information that will help guide future restoration and conservation activities as they pertain to managing rice farms and surrounding natural habitats for the giant garter snake. Continuing project activities include ongoing telemetry of radio-marked snakes to evaluate habitat use and behavior, and trapping of snakes to develop mark/recapture estimates. Results from these projects will support filling in some of the research data gaps for the giant garter snake including determination of optimal habitat, effects of cropping patterns and specific agricultural practices on movement patterns and viability, value of restored habitats, and species status and distribution. Additionally, results from these research projects will directly facilitate future revisions of the conservation measures within this strategy. DWR and its partners will continue to work with the ERP implementing agencies and grant recipients to facilitate giant garter snake conservation.

6. Direct Effects of the Proposed Project

Very little data exists on the distribution and occurrence of the giant garter snake in ricelands. Therefore, it is difficult to anticipate the level of effects the proposed project will have on GGS.

Temporal (one year) water transfers from the DWB are expected to contribute a relatively small amount of rice idling acreage in relation to the normal variation in planted rice acreage resulting from typical farming practices. The proposed fallowing or crop conversion of up to approximately 67,260 acres of rice fields to alternate crops in the action area will reduce the availability of stable wetland areas, which are important to stable giant garter snake populations, for one year. The proposed fallowing or conversion to alternate crops of up to approximately 67,260 acres of rice fields in the action area may result in an increased risk of predation on individual giant garter snakes. Rice fields provide cover for snakes to escape predators. Ditches, canals, and other agricultural conveyances typically do not provide much cover in the form of emergent vegetation. Predators such as large fish, egrets, and herons are more prevalent in ditches and canals and are known to prey on giant garter snakes.

The proposed project may reduce suitable giant garter snake foraging habitat by as much as 20 percent from the 10 year average of all rice crops in the action area for a one year period. As a result, we anticipate that some individuals may have to relocate from an area that may have been their foraging area in prior years. Although individual snakes that must relocate are likely to be subject to greater risk of predation as they move to find new suitable foraging areas, we anticipate that some individuals will be able to successfully relocate in suitable habitat elsewhere within the area. Young snakes (2 years and less) that need to relocate may be particularly vulnerable to the increased predation risk. A large reduction in available habitat and foraging opportunities compared to recent years (2007 and 2006 – 11,867 and 9,273 acres respectively) may adversely affect foraging success and breeding condition if some individuals are unable to relocate. Young snakes would be anticipated to be at greater risk.

We do not know and have no information with which to estimate the size or age-class structure of the resident snake population in the action area. Whatever it is, it is a product of annual fluctuation in acreage planted to rice prior to 2008, in combination with other physical and environmental factors. Some individuals are likely to be displaced and will need to relocate elsewhere. Of these, we expect that some will successfully relocate, and that some may be lost to predation or other forms of mortality caused by loss of foraging opportunities, either through competition with other individuals or loss of body condition and failure to thrive, particularly young snakes. Measures such as idling using a checkerboard pattern and not idling a field in 2009 that was idled in the previous year are being proposed under the proposed project to minimize the potential for such effects, with the assumption that proximity to water results in decreased stress on snake populations.

7. Indirect Effects

Natural and managed seasonal wetlands and riparian communities often depend on surface water/groundwater interactions for part or all of their water supply. Subsurface drawdown related to groundwater substitution transfers could result in hydrologic changes to nearby streams and marshes, potentially affecting GGS habitat, including GGS preserves and conservation banks, including Willey and Pritchard Lakes Preserves.

Before groundwater substitution actions are initiated, the hydrogeologic conditions of wells used for groundwater substitution will be examined to minimize the potential risk of depleting surface water sources and adversely affecting hydrologic conditions of GGS habitat. Implementation of the Well Adequacy Review and monitoring program as described in the 2009 Drought Water Bank Draft EA will ensure the effects on GGS habitat from groundwater substitution actions are avoided or minimized by reviewing proposed well locations for proximity to surface water sources and requiring that sellers providing water to the DWB via groundwater substitution provide groundwater monitoring and mitigation programs for review by DWR and Reclamation during the transfer approval process.

8. Effects of interrelated and interdependent actions

SJKF

Under the proposed project, transfer water would not lead to the conversion of annual crops to permanent (woody) crops because the water transferred for agricultural demand would be used to irrigate lands/crops that were under irrigation over the last 3-year period, 2006 through 2008, to ensure it is applied only to currently-cultivated lands.

GGS

Repeated episodes of dewatering may result in reduced survivorship or fecundity when females are displaced from familiar retreats and basking sites. Abundant food resources are also essential for females to both recover body mass after giving birth and to survive the overwintering period when the snakes do not forage, and for young snakes which rely on smaller prey items most typical of rice fields. Fallowing of rice fields not related to the proposed project may not only temporarily remove suitable habitat, but may adversely affect reproduction, recruitment, and survival in the long term.

9. Proposed Conservation Measures

The 2009 DWB will adopt the crop idling Conservation Measures from the EWA Biological Opinion with some modifications, described below. The modifications will allow for better Program participation and increased potential to monitor, research, and protect giant garter snake populations. The following actions to protect the giant garter

snake will be incorporated into contracts between DWR and the water seller. As part of the contract, DWR will have access to the land to verify how the water transfer is being made available and to verify that the actions to protect the giant garter snake are being implemented.

- The block size of idled rice parcels will be limited to 320 acres in size with no more than 20 percent of rice field idled cumulatively (from all sources of fallowing) in each county or area within 1 mile of the following refuge areas: Sacramento National Wildlife Refuge Complex (Sacramento, Delevan, Colusa, Sutter, Butte Sink and Llano Seco Unit), Gray Lodge Wildlife Area (WA), Upper Butte Basin WA, and Gilsizer Slough Conservation Easement. The 320-acre blocks will not be located on opposite sides of a canal or other waterway, and will not be immediately adjacent to another fallowed parcel (a checkerboard pattern is the preferred layout);
- Parcels in the Program will not include:
 - a. Lands between Refuges that serve as corridors: lands adjacent to Hunters and Logan Creeks between Sacramento National Wildlife Refuge (NWR) and Delevan NWR; the Colusa Basin drainage canal between Delevan and Colusa NWRs; Little Butte Creek between Llano Seco (NWR unit) and Upper Butte Basin WA; and Butte Creek between Upper Butte Basin and Gray Lodge WA;
 - b. Lands adjacent to Butte Creek, Colusa Drainage Canal, Gilsizer Slough, the land side of the Toe Drain along the Sutter Bypass, Willow Slough and Willow Slough Bypass in Yolo County, and
 - c. Lands in the Natomas Basin;
- The water seller will maintain a depth of at least two feet of water in the major irrigation and drainage canals (but never more than existing conditions) to provide movement corridors;
- Water will not be purchased from a field fallowed in the previous year;
- Sellers will voluntarily perform giant garter snake best management practices, which are in Appendix K of the Draft Recovery Plan.

The expansion of the block size from 160 acres (1/2 mile on each side of a square) to 320 acres (3/4 mile on each side of a square) would change the distance a giant garter snake would travel through an idled block by 1/4 mile or 1,320 feet. The original 160 acre block size was largely based on estimates of median home range size. Although the median is a useful number, the home range size of an animal is affected by many variables (Ricklefs and Miller 1999) and may be a misleading indicator of the distance an animal can travel successfully between habitats. Estimates of maximum home range

sizes and distances traveled suggest that a 320 acre block is a reasonable size for a giant garter snake to navigate. In addition, the seller will be required to maintain at least two feet of water in major irrigation and drainage canals to serve as movement corridors for giant garter snakes.

The expansion of the block size by up to 1,320 feet has the potential to expose giant garter snakes to more adverse habitat conditions and potentially increase their exposure to predators. However, implementing a checkerboard pattern, maintaining water in main ditches and canals, and excluding core habitats and corridors will likely help avoid and minimize these potential impacts.

The EWA Biological Opinion originally excluded Yolo County east of Highway 113 from crop idling and substitution actions. Yolo County is known to support the giant garter snake, yet very little data is available on the population size or distribution within this area. Surveys in 2005-2007, documented snakes at the Yolo Wildlife Area, Conaway Ranch, and Davis Wetlands (Hansen 2008). A giant garter snake Conservation Bank has been established south of I-80 inside the Yolo Bypass and habitat has been created for the giant garter snake within the Yolo Wildlife Area.

Excluding the area east of HWY 113 in Yolo County from Drought Water Bank actions has the potential to both reduce the amount of water available to the Program, as well as restrict the monitoring and research goals in the Conservation Strategy. Existing protected habitats within the area and the Conservation Measures outlined in the DWB would reduce any potential impacts of including this area in the DWB.

The Natomas Basin will also be excluded from the Drought Water Bank. This area is currently implementing a Habitat Conservation Plan for impacts to the giant garter snake.

Conservation Strategy

DWR has prepared a Giant Garter Snake Baseline Monitoring and Research Strategy (Strategy). The implementation of this Strategy will provide significant contributions towards the development of a Giant Garter Snake Conservation Strategy for the Sacramento Valley. The focus of the Strategy will be in the Colusa, Butte, Sutter, and Yolo Basins.

The goal of the Strategy is to develop actions that will contribute to the recovery of giant garter snake populations in the Sacramento Valley, and to provide guidance for avoidance and mitigation measures as part of the Drought Water Bank (*i.e.*, crop idling and crop substitution).

In order to aid in the recovery needs of the species, the research and monitoring goals outlined in the Strategy are consistent with those identified in the *Draft Recovery Plan for the Giant Garter Snake* (USFWS 1999). The Recovery Plan provides information on the management and research activities related to recovery of the species and serves as a road map for species recovery by identifying the actions necessary to support recovery of the species.

The monitoring needs and actions required for the recovery of the species are outlined in the Draft Recovery Plan (USFWS 1999) and include:

Monitoring

1. Develop and implement a monitoring plan for giant garter snake populations,
2. Survey for new populations,
3. Conduct mark-recapture studies in selected areas for mortality, fecundity, and population size estimates, and
4. Use radio-telemetry to study habitat use, home range size, and mortality.

The Strategy will implement a radio-telemetry study to evaluate and quantify the response of the giant garter snake to riceland idling, thereby providing additional data on giant garter snake behavior and ecology. Furthermore, ongoing studies funded through the Ecosystem Restoration Program will provide data on giant garter snake response to cropland idling and habitat restoration.

Monitor populations

1. Conduct research on demographics, population genetics, and habitat use,
2. Develop and implement private landowner incentive programs, and
3. Develop outreach and educational information for private landowners.

Actions Needed for Recovery

1. Protect existing populations and habitat,
2. Restore populations to former habitat,
3. Survey to determine species distributions,

In addition, the Recovery Plan identifies four Recovery Units within California's Central Valley: 1) Sacramento Valley, 2) Mid-Valley, 3) San Joaquin Valley, and 4) South Valley Recovery Units. The Recovery Units are subunits of the species range that are geographically or otherwise identifiable and essential to the recovery of the species. Establishing recovery units is a useful management tool for species with multiple populations, varying ecological pressures, or with different threats in different parts of their range.

Monitoring and Research Goals

Monitoring and research will be the primary tools to gather the information necessary to develop the Conservation Strategy. Monitoring will be designed to assess population structure, distribution, and movement within the Sacramento Valley and Mid-Valley Recovery Units, as well as, determine the existing (*i.e.* baseline) population of study sites. Wet and dry cycles are a common feature of the Sacramento Valley's climate. Since 1906, wet and dry cycles have lasted a maximum of 8 and 6 years, respectively

(California Date Exchange Center 2007). The duration of monitoring and research study designs will incorporate the goal of including wet, dry, and normal rainfall years. However, given the limitations associated with radio-telemetry and catching snakes large enough to radio, achieving this goal may not be feasible.

Broad monitoring and research goals include:

1. Develop and implement a monitoring plan for giant garter snake populations in the Sacramento Valley and Mid-Valley Recovery Units,
2. Monitor giant garter snake populations for a minimum of ten years using multiple survey methods (e.g., trapping (Casazza et al. 2000), hand captures, and mark-recapture),
3. Use radio-telemetry and mark-recapture to study habitat use and selection, mortality rates, response to crop idling, and use of rice lands for a minimum of five years, and
4. Gather enough data to make recommendations to minimize the effects of crop idling practices on the giant garter snake and make general conservation recommendations to the California Rice Industry Association to update their 1995 publication *Managing Ricelands for Giant Garter Snakes*. Conservation recommendations may include actions that rice farmers could implement to reduce potential impacts to the giant garter snake from rice farming, or actions a rice farmer could implement to increase the habitat value for the giant garter snake.

Specific monitoring goals include:

1. Monitor giant garter snakes at a minimum of two locations within both the Sacramento Valley and Mid-Valley Recovery Units,
2. Design monitoring to include locations of known giant garter snake populations (e.g., Colusa National Wildlife Refuge) and areas within the Sacramento Valley and Mid-Valley Recovery Units that appear to have suitable habitat, but have not been trapped or not trapped extensively,
3. Design monitoring to include representative habitats in each unit to serve as an index of population status in the Sacramento Valley and Mid-Valley Recovery Units,
4. Monitor for a minimum of ten years with the goal of including wet, dry, and normal rainfall years (California Date Exchange Center 2007) in the monitoring,
5. Design monitoring to include areas that will enhance knowledge of giant garter snake distribution within the Sacramento Valley, and
6. Adapt monitoring locations and duration as new data becomes available.

Specific research goals include:

1. Implement a radio telemetry study for a minimum of five years,

2. Quantify and evaluate the response (*e.g.*, movement patterns and survival) of giant garter snakes to changes in habitat conditions and landscape cropping patterns,
3. Quantify and evaluate the response of giant garter snakes to crop idling including a specific experimental design to evaluate different block sizes and landscape patterns,
4. Examine the relationship of giant garter snake habitat use in relation to habitat availability and surrounding land use using GIS technologies, and
5. Quantify giant garter snake survival and population fecundity (*e.g.*, number of immature to adults) in relation to changing environmental and habitat conditions and identify variables that may be important correlates of survival and fecundity,
6. Quantify minimum size of buffer zone between idled rice fields and suitable habitat, and
7. Provide recommendations for adaptive management of giant garter snakes with respect to water transfers.

Study Sites

The monitoring and research sites will focus on populations of giant garter snakes located in the Sacramento Valley and the Mid-Valley Recovery Units. Potential study sites include:

Sacramento Valley Recovery Unit

1. Butte Basin
 - a. Upper Butte Basin Wildlife Area (DFG)
 - b. Gray Lodge Wildlife Area (DFG)
 - c. Sacramento National Wildlife Refuge Complex-Llano Seco Unit (USFWS)
2. Colusa Basin
 - a. Colusa and Delevan National Wildlife Refuges (USFWS)
 - b. Ridge Cut Slough (Wildlands, Incorporated; 2,300 acres)
3. Sutter Basin
 - a. Sutter National Wildlife Refuge (USFWS)
 - b. Gilsizer Slough (Wildlands, Incorporated; 565 acres)

Mid-Valley Recovery Unit

1. Northern Yolo Basin
 - a. Conaway Ranch
 - b. Yolo Wildlife Area (DFG)

Within the sites mentioned above, there are a few that have the potential to support a riceland idling study:

Mid-Valley Recovery Unit

1. Northern Yolo Basin
 - a. Conaway Ranch
 - b. Yolo Wildlife Area (DFG; rice and managed wetlands are part of the Wildlife Area)

Sacramento Valley Recovery Unit

1. Butte Basin
 - a. Upper Butte Basin Wildlife Area (DFG; rice and managed wetlands are part of the Wildlife Area)

Implementation

During the first year of implementation, DWR will work with staff from the Sacramento National Wildlife Refuge Complex, Upper Basin Wildlife Area, Wildlands, Conaway Ranch, and other interested parties to determine any gaps in existing data, and the feasibility of monitoring snakes and conducting research on their lands.

In addition, DWR staff will work with the appropriate water agencies in the Sacramento Valley (*e.g.*, Glenn Colusa Irrigation District and Butte Water Agency) to determine the feasibility of conducting monitoring in their canals and on private lands within their districts. Metropolitan Water District currently has Eric Hansen under contract to assemble and report available data pertaining to giant garter snake and associations with rice agriculture, and identify data gaps, particularly those pertaining to rice fallowing and the implicated significance of rice to giant garter snake life history. This information will aid research and monitoring plan development.

DWR will coordinate with USFWS and DFG during all phases of monitoring and project development.

Giant Garter Snake Distribution and Abundance

During or prior to the spring of 2010, DWR will initiate giant garter snake monitoring on a minimum of two sites within both the Sacramento Valley and Mid Valley Recovery Units. Data from the first year of monitoring, as well as, the experience gained from the first year, will be used to enhance future monitoring success and design a specific research project proposal that will evaluate giant garter snake response to riceland idling and use of rice landscapes over a five year period.

Baseline Surveys for the Giant Garter Snake in the Sacramento Valley

The goal of these surveys is to obtain baseline data of the occurrence and distribution of the giant garter snake on riceland throughout the Sacramento Valley. This will be accomplished through trapping and visual surveys. Using this data and by examining patterns of occurrence of the giant garter snake, DWR will work with the USGS to develop occupancy models.

The basic study design to gather the data to develop occupancy models would likely include:

- Conducting repeated surveys (trapping or visual surveys) at a number of sites owned by cooperative landowners beginning in late April or early May, 2009.
- Sites shall be stratified by crop type and history, and survey locations within sites shall be selected randomly from locations available for sampling (> 20 cm standing water available, with preference given to locations with permanent water).
- Data regarding canal/crop histories shall be obtained from all landowners, even if they do not wish to participate in on-the-ground surveys.
- Potential sampling protocols include:
 - Equal number of repeat surveys at all sites. This method allows the greatest flexibility for analysis and can account for differences in detection probabilities across sites. A preliminary analysis of existing data will guide the number of sites and surveys, which will depend upon the survey method, and desired level of precision.
 - Removal sampling, where sites are surveyed until presence of the giant garter snake is confirmed or a maximum number of surveys occurs. This design can be more efficient than an equal number of surveys at all sites (particularly if the probability of occurrence is less than 0.3), but is ineffective at distinguishing among sites with varying characteristics. Because occurrence of the giant garter snake likely depends upon habitat characteristics and site history, this method may be inappropriate.
 - A hybrid design is also possible, with some sites surveyed a fixed number of times and others sampled under the removal design.
- Weather and habitat data will be collected concurrently with each survey to control for variables that affect detection probability and occurrence probability.

A successful occupancy study will result in:

1. Detection probabilities for the giant garter snake, and an estimate of the influence of habitat and weather variables on detection probability.
2. Probability of occurrence of the giant garter snake as a function of crop type/cropping history.
3. Probability of occurrence of the giant garter snake as a function of canal/watercourse history (particularly drying, dredging, and vegetation removal, and timing of these activities).

These results will help quantify suitable habitats for the giant garter snake to focus future surveys, conservation, and locate potential study sites for a quantitative assessment of the

effects of fallowing practices (fallowing duration, fallowed plot size, and landscape configuration of fallowed plots) to minimize negative impacts to the giant garter snake.

Riceland Study

With the data from the first year of implementation and the resulting relationships that will be formed with landowners, the specific locations of a riceland idling study will be determined. Ideally, a five year study will be replicated at a minimum of two locations, one in the Sacramento Valley and one in the Mid Valley Recovery Unit. The study will include:

1. Trapping and radio-telemetry,
2. Deliberately idling ricelands, and,
3. Evaluating the spatial configuration of ricelands and associated waterways,
4. Tracking radio-marked snakes to determine habitat use, home range size, and survival.

Program Funding

Estimating the cost of long term research and monitoring, especially for a rare species in which we have only limited knowledge can be challenging. DWR has reviewed the budgets from previous short term studies on giant garter snakes, and talked with other researchers who have conducted long term studies, particularly those that used radio-telemetry. As a result of this due diligence, DWR will allocate:

Task	Years	Annual Cost	Total Cost
Baseline Monitoring	10	\$625,000	\$6,250,000
Crop Idling Study	5	\$275,000	\$1,375,000
Distribution and Abundance Monitoring	10	\$125,000	\$1,250,000
Contingency 1% of 10 year cost			\$375,000
California Wildlife Foundation*	overhead		TBD
		Total Allocation	\$9,250,000

* This cost will be negotiated with the appropriate Foundation

Agency Coordination

DWR will provide the USFWS and DFG quarterly progress reports on the development of the Conservation Strategy, as well as, an annual report summarizing the work and results of that year. Throughout the development of the Conservation Strategy, DWR will coordinate with project partners (e.g. BOR), the USFWS, DFG, USGS, and other recognized experts in conservation and research to insure the integrity of the Conservation Strategy and associated research and monitoring.

Conservation Recommendations

Information gained from this Strategy will play a vital role in informing other ongoing and future efforts to conserve and recover giant garter snakes. Finalization of the Federal Recovery Plan will benefit from knowledge gained through this process. Programs such as the ERP can direct funding opportunities by considering outcomes of this Strategy. Results from trapping and radio-telemetry will be used to develop giant garter snake conservation recommendations for SWP and CVP operations. In addition, data from the riceland telemetry work will be used to make giant garter snake conservation recommendations to the California Rice Industry Association to update their publication, *Managing Ricelands for Giant Garter Snakes*.

Access to private lands for survey and research needs will be difficult, but cannot be ruled out as it is in the best interest of the Strategy and for the future of any similar actions to those found in the 2009 DWB. To get meaningful data for monitoring and research on private lands, DWR and BOR will need to develop strong relationships and build trust with local land owners and water agencies as more than one year of data will be necessary for biologically meaningful and statistically valid conclusions. DWR has requested that participants in the program allow access to their lands so that baseline information can be gathered. However, since neither Reclamation nor DWR own or control the private lands which are participating in the DWB program, they are not able to guarantee access to the idled lands for baseline studies or effect analysis surveys to be conducted.

As DWR will be the agency implementing contracts for the DWB, and Reclamation has an approval role for DWB transfers involving CVP contractors, Reclamation is consulting on behalf of the DWB Project Agencies, including DWR. While DWR will be responsible for implementation of the proposed conservation measures, Reclamation will coordinate closely with DWR to ensure implementation of the proposed conservation measures.

10. Determination of Effects

Reclamation has determined that implementation of the proposed project is likely to adversely affect giant garter snakes as a result of increased mortality from increased competition for resources, reduced reproductive rates, and increased mortality from predation when crossing dewatered areas in search of suitable forage areas. Fallowing or planting non-wetland crops on up to approximately 67,260 acres of rice lands under the proposed project is to likely adversely affect the short-term ability of individual giant garter snakes to forage, reproduce, and find shelter. Reclamation cannot accurately predict the number of individual giant garter snakes that may be lost because there are no population data available for the action area. However, Reclamation has determined that with the proposed minimization measures and conservation strategy, these short term losses are not likely to jeopardize the continued existence of the giant garter snake. Critical habitat has not been designated for this species, therefore none will be affected.

Reclamation has determined that the proposed project is not likely to adversely affect SJKF because under the proposed project, transfer water would be conveyed using existing facilities, and would be used to meet only existing urban and agricultural demands for crops that have been irrigated in each of the last three years.

11. References

Department of Water Resources 2008. Draft Water Transfers in 2009 Involving the California Department of Water Resources and Bureau of Reclamation, Mid-Pacific Region. Information to Parties Interested In Making Water Available to the State's 2009 Drought Water Bank and Bureau of Reclamation's Water Acquisition Program. August 2008.

Fish and Wildlife Service, 2004. Programmatic Biological Opinion on the Proposed Environmental Water Account Program

National Marine Fisheries Service, 2004. Letter of Concurrence for the Proposed Environmental Water Account Program

Reclamation et. al., 2003. Environmental Water Account, Draft and Final Environmental Impact Statement/Environmental Impact Reports.

Reclamation et. al., 2007. Environmental Water Account Draft and Final Environmental Impact Statement/Environmental Impact Reports

Reclamation 2009 Drought Water Bank Draft Environmental Assessment.

12. List of Preparers and Reviewers

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U.S. Fish & Wildlife Service

Sacramento Fish & Wildlife Office

**Federal Endangered and Threatened Species that Occur in
or may be Affected by Projects in the Counties and/or
U.S.G.S. 7 1/2 Minute Quads you requested**

Document Number: 081208113432

Database Last Updated: September 11, 2008

No quad species lists requested.

County Lists

Listed Species

Invertebrates

- Branchinecta conservatio
 - Conservancy fairy shrimp (E)
 - Critical habitat, Conservancy fairy shrimp (X)

- Branchinecta longiantenna
 - Critical habitat, longhorn fairy shrimp (X)
 - longhorn fairy shrimp (E)

- Branchinecta lynchi
 - Critical habitat, vernal pool fairy shrimp (X)
 - vernal pool fairy shrimp (T)

- Desmocerus californicus dimorphus
 - Critical habitat, valley elderberry longhorn beetle (X)

- valley elderberry longhorn beetle (T)
- *Elaphrus viridis*
 - Critical habitat, delta green ground beetle (X)
 - delta green ground beetle (T)
- *Euphydryas editha bayensis*
 - bay checkerspot butterfly (T)
 - Critical habitat, bay checkerspot butterfly (X)
- *Euproserpinus euterpe*
 - Kern primrose sphinx moth (T)
- *Lepidurus packardii*
 - Critical habitat, vernal pool tadpole shrimp (X)
 - vernal pool tadpole shrimp (E)
- *Speyeria callippe callippe*
 - callippe silverspot butterfly (E)
- *Speyeria zerene myrtleae*
 - Myrtle's silverspot butterfly (E)
- *Syncaris pacifica*
 - California freshwater shrimp (E)

Fish

- *Acipenser medirostris*

- green sturgeon (T) (NMFS)
- *Eucyclogobius newberryi*
 - tidewater goby (E)
- *Hypomesus transpacificus*
 - Critical habitat, delta smelt (X)
 - delta smelt (T)
- *Oncorhynchus (=Salmo) aquabonita whitei*
 - Critical habitat, little Kern golden trout (X)
 - Little Kern golden trout (T)
- *Oncorhynchus (=Salmo) clarki henshawi*
 - Lahontan cutthroat trout (T)
- *Oncorhynchus kisutch*
 - coho salmon - central CA coast (E) (NMFS)
 - coho salmon, So OR/No CA (T) (NMFS)
 - Critical habitat, coho salmon - central CA coast (X) (NMFS)
 - Critical habitat, coho salmon, So OR/No CA (X) (NMFS)
- *Oncorhynchus mykiss*
 - Central California Coastal steelhead (T) (NMFS)
 - Central Valley steelhead (T) (NMFS)
 - Critical habitat, Central California coastal steelhead (X) (NMFS)
 - Critical habitat, Central Valley steelhead (X) (NMFS)
 - Critical habitat, Northern California steelhead (X) (NMFS)
 - Northern California steelhead (T) (NMFS)
 - South Central California steelhead (T) (NMFS)
- *Oncorhynchus tshawytscha*

- Central Valley spring-run chinook salmon (T) (NMFS)
- Critical Habitat, Central Valley spring-run chinook (X) (NMFS)
- Critical habitat, winter-run chinook salmon (X) (NMFS)
- winter-run chinook salmon, Sacramento River (E) (NMFS)

Amphibians

- *Ambystoma californiense*
 - California tiger salamander, central population (T)
 - Critical habitat, CA tiger salamander, central population (X)
- *Rana aurora draytonii*
 - California red-legged frog (T)
 - Critical habitat, California red-legged frog (X)

Reptiles

- *Gambelia (=Crotaphytus) sila*
 - blunt-nosed leopard lizard (E)
- *Masticophis lateralis euryxanthus*
 - Alameda whipsnake [=striped racer] (T)
 - Critical habitat, Alameda whipsnake (X)
- *Thamnophis gigas*
 - giant garter snake (T)
- *Thamnophis sirtalis tetrataenia*
 - San Francisco garter snake (E)

Birds

- *Brachyramphus marmoratus*

- marbled murrelet (T)

- *Charadrius alexandrinus nivosus*
 - western snowy plover (T)

- *Empidonax traillii extimus*
 - Critical habitat, southwestern willow flycatcher (X)
 - southwestern willow flycatcher (E)

- *Gymnogyps californianus*
 - California condor (E)
 - Critical habitat, California condor (X)

- *Pelecanus occidentalis californicus*
 - California brown pelican (E)

- *Rallus longirostris obsoletus*
 - California clapper rail (E)

- *Sternula antillarum* (=Sterna, =albifrons) browni
 - California least tern (E)

- *Strix occidentalis caurina*
 - Critical habitat, northern spotted owl (X)
 - northern spotted owl (T)

- *Vireo bellii pusillus*
 - Least Bell's vireo (E)

Mammals

- *Dipodomys ingens*
 - giant kangaroo rat (E)

- *Dipodomys nitratoide exilis*
 - Fresno kangaroo rat (E)

- *Dipodomys nitratoide nitratoide*
 - Tipton kangaroo rat (E)

- *Neotoma fuscipes riparia*
 - riparian (San Joaquin Valley) woodrat (E)

- *Ovis canadensis californiana*
 - Sierra Nevada (=California) bighorn sheep (E)

- *Reithrodontomys raviventris*
 - salt marsh harvest mouse (E)

- *Sorex ornatus relictus*
 - Buena Vista Lake shrew (E)
 - Critical habitat, Buena Vista Lake shrew (X)

- *Sylvilagus bachmani riparius*
 - riparian brush rabbit (E)

- *Vulpes macrotis mutica*

- San Joaquin kit fox (E)

Plants

- *Amsinckia grandiflora*
 - Critical habitat, large-flowered fiddleneck (X)
 - large-flowered fiddleneck (E)
- *Astragalus clarianus*
 - Clara Hunt's milk-vetch (E)
- *Castilleja affinis* ssp. *neglecta*
 - Tiburon paintbrush (E)
- *Castilleja campestris* ssp. *succulenta*
 - Critical habitat, succulent (=fleshy) owl's-clover (X)
 - succulent (=fleshy) owl's-clover (T)
- *Caulanthus californicus*
 - California jewelflower (E)
- *Ceanothus ferrisiae*
 - Coyote ceanothus (E)
- *Chamaesyce hooveri*
 - Critical habitat, Hoover's spurge (X)
 - Hoover's spurge (T)
- *Cirsium hydrophilum* var. *hydrophilum*

- Suisun thistle (E)
- *Clarkia springvillensis*
 - Springville clarkia (T)
- *Cordylanthus mollis* ssp. *mollis*
 - soft bird's-beak (E)
- *Cordylanthus palmatus*
 - palmate-bracted bird's-beak (E)
- *Dudleya setchellii*
 - Santa Clara Valley dudleya (E)
- *Eremalche kernensis*
 - Kern mallow (E)
- *Lasthenia conjugens*
 - Contra Costa goldfields (E)
 - Critical habitat, Contra Costa goldfields (X)
- *Limnanthes floccosa* ssp. *californica*
 - Butte County (Shippee) meadowfoam (E)
 - Critical habitat, Butte County (Shippee) meadowfoam (X)
- *Monolopia congdonii* (= *Lembertia congdonii*)
 - San Joaquin woolly-threads (E)

- *Navarretia leucocephala* ssp. *pauciflora*
 - few-flowered navarretia (E)

- *Neostapfia colusana*
 - Colusa grass (T)
 - Critical habitat, Colusa grass (X)

- *Oenothera deltoides* ssp. *howellii*
 - Antioch Dunes evening-primrose (E)

- *Opuntia treleasei*
 - Bakersfield cactus (E)

- *Orcuttia inaequalis*
 - Critical habitat, San Joaquin Valley Orcutt grass (X)
 - San Joaquin Valley Orcutt grass (T)

- *Orcuttia pilosa*
 - Critical habitat, hairy Orcutt grass (X)
 - hairy Orcutt grass (E)

- *Orcuttia tenuis*
 - Critical habitat, slender Orcutt grass (X)
 - slender Orcutt grass (T)

- *Orcuttia viscida*
 - Critical habitat, Sacramento Orcutt grass (X)
 - Sacramento Orcutt grass (E)

- *Plagiobothrys strictus*
 - *Calistoga allocarya* (popcorn-flower) (E)

- *Poa napensis*
 - Napa bluegrass (E)

- *Pseudobahia peirsonii*
 - San Joaquin adobe sunburst (T)

- *Senecio layneae*
 - Layne's butterweed (=ragwort) (T)

- *Sidalcea keckii*
 - Critical habitat, Keck's checker-mallow (X)
 - Keck's checker-mallow (=checkerbloom) (E)

- *Streptanthus albidus* ssp. *albidus*
 - Metcalf Canyon jewelflower (E)

- *Tuctoria greenei*
 - Critical habitat, Greene's tuctoria (=Orcutt grass) (X)
 - Greene's tuctoria (=Orcutt grass) (E)

- *Tuctoria mucronata*
 - Critical habitat, Solano grass (=Crampton's tuctoria) (X)
 - Solano grass (=Crampton's tuctoria) (E)

Proposed Species

Fish

- *Oncorhynchus mykiss*
 - Critical habitat, South Central California steelhead (PX) (NMFS)

Plants

- *Cirsium hydrophilum* var. *hydrophilum*
 - Critical habitat, Suisun thistle (PX)
- *Cordylanthus mollis* ssp. *mollis*
 - Critical habitat, soft bird's-beak (PX)

Candidate Species

Amphibians

- *Rana muscosa*
 - mountain yellow-legged frog (C)

Birds

- *Coccyzus americanus occidentalis*
 - Western yellow-billed cuckoo (C)

Mammals

- *Martes pennanti*
 - fisher (C)

Plants

- *Abronia alpina*
 - Ramshaw sand-verbena (C)

- Ivesia webberi
 - Webber's ivesia (C)
- Rorippa subumbellata
 - Tahoe yellow-cress (C)

Key:

- (E) Endangered - Listed as being in danger of extinction.
- (T) Threatened - Listed as likely to become endangered within the foreseeable future.
- (P) Proposed - Officially proposed in the Federal Register for listing as endangered or threatened.
- (NMFS) Species under the Jurisdiction of the [National Oceanic & Atmospheric Administration Fisheries Service](#). Consult with them directly about these species.
- Critical Habitat - Area essential to the conservation of a species.
- (PX) Proposed Critical Habitat - The species is already listed. Critical habitat is being proposed for it.
- (C) Candidate - Candidate to become a proposed species.
- (V) Vacated by a court order. Not currently in effect. Being reviewed by the Service.
- (X) Critical Habitat designated for this species

Important Information About Your Species List

How We Make Species Lists

We store information about endangered and threatened species lists by U.S. Geological Survey 7½ minute quads. The United States is divided into these quads, which are about the size of San Francisco.

The animals on your species list are ones that occur within, or may be affected by projects within, the quads covered by the list.

- Fish and other aquatic species appear on your list if they are in the same watershed as your quad or if water use in your quad might affect them.
- Amphibians will be on the list for a quad or county if pesticides applied in that area may be carried to their habitat by air currents.
- Birds are shown regardless of whether they are resident or migratory. Relevant birds on the county list should be considered regardless of whether they appear on a quad list.

Plants

Any plants on your list are ones that have actually been observed in the area covered by the list. Plants may

exist in an area without ever having been detected there. You can find out what's in the surrounding quads through the California Native Plant Society's online [Inventory of Rare and Endangered Plants](#).

Surveying

Some of the species on your list may not be affected by your project. A trained biologist and/or botanist, familiar with the habitat requirements of the species on your list, should determine whether they or habitats suitable for them may be affected by your project. We recommend that your surveys include any proposed and candidate species on your list.

See our [Protocol](#) and [Recovery Permits](#) pages.

For plant surveys, we recommend using the [Guidelines for Conducting and Reporting Botanical Inventories](#). The results of your surveys should be published in any environmental documents prepared for your project.

Your Responsibilities Under the Endangered Species Act

All animals identified as listed above are fully protected under the Endangered Species Act of 1973, as amended. Section 9 of the Act and its implementing regulations prohibit the take of a federally listed wildlife species. Take is defined by the Act as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" any such animal.

Take may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or shelter (50 CFR §17.3).

Take incidental to an otherwise lawful activity may be authorized by one of two procedures:

- If a Federal agency is involved with the permitting, funding, or carrying out of a project that may result in take, then that agency must engage in a formal [consultation](#) with the Service.
- During formal consultation, the Federal agency, the applicant and the Service work together to avoid or minimize the impact on listed species and their habitat. Such consultation would result in a biological opinion by the Service addressing the anticipated effect of the project on listed and proposed species. The opinion may authorize a limited level of incidental take.
- If no Federal agency is involved with the project, and federally listed species may be taken as part of the project, then you, the applicant, should apply for an incidental take permit. The Service may issue such a permit if you submit a satisfactory conservation plan for the species that would be affected by your project.
- Should your survey determine that federally listed or proposed species occur in the area and are likely to be affected by the project, we recommend that you work with this office and the California Department of Fish and Game to develop a plan that minimizes the project's direct and indirect impacts to listed species and compensates for project-related loss of habitat. You should include the plan in any environmental documents you file.

Critical Habitat

When a species is listed as endangered or threatened, areas of habitat considered essential to its

conservation may be designated as critical habitat. These areas may require special management considerations or protection. They provide needed space for growth and normal behavior; food, water, air, light, other nutritional or physiological requirements; cover or shelter; and sites for breeding, reproduction, rearing of offspring, germination or seed dispersal.

Although critical habitat may be designated on private or State lands, activities on these lands are not restricted unless there is Federal involvement in the activities or direct harm to listed wildlife.

If any species has proposed or designated critical habitat within a quad, there will be a separate line for this on the species list. Boundary descriptions of the critical habitat may be found in the Federal Register. The information is also reprinted in the Code of Federal Regulations (50 CFR 17.95). See our [Map Room](#) page.

Candidate Species

We recommend that you address impacts to candidate species. We put plants and animals on our candidate list when we have enough scientific information to eventually propose them for listing as threatened or endangered. By considering these species early in your planning process you may be able to avoid the problems that could develop if one of these candidates was listed before the end of your project.

Species of Concern

The Sacramento Fish & Wildlife Office no longer maintains a list of species of concern. However, various other agencies and organizations maintain lists of at-risk species. These lists provide essential information for land management planning and conservation efforts. [More info](#)

Wetlands

If your project will impact wetlands, riparian habitat, or other jurisdictional waters as defined by section 404 of the Clean Water Act and/or section 10 of the Rivers and Harbors Act, you will need to obtain a permit from the U.S. Army Corps of Engineers. Impacts to wetland habitats require site specific mitigation and monitoring. For questions regarding wetlands, please contact Mark Littlefield of this office at (916) 414-6580.

Updates

Our database is constantly updated as species are proposed, listed and delisted. If you address proposed and candidate species in your planning, this should not be a problem. However, we recommend that you get an updated list every 90 days. That would be March 08, 2009.